MODERN METHODS IN THE DIAGNOSIS OF DISEASES OF THE DIGESTIVE SYSTEM.*

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It is my purpose in this paper to briefly call attention to the growing importance of the diseases and disturbances of the digestive organs, and to the value of the data obtained by careful and well-directed efforts in clinical or laboratory diagnosis.

However, I wish it distinctly understood that I would not supplant the art of physical diagnosis with that of the laboratory, but would combine them intelligently, that each might aid and confirm the other in their conclusions and results.

The so-called "Errors of Metabolism," *i. e.*, "Diabetes Mellitus," "Obesity," "Marasmus," etc., are often, but not always, the expression of disease of some digestive organ whose function is thus perverted, and whose efforts are misdirected, and one of the hardest problems for the science of medicine to work out in the future is the role played by the overtaxing and loss of power of the various organs which make up the digestive system, in the production of interstitial nephritis and arteriosclerosis, with their attendant heart lesions, gallstones, chronic gastric catarrhs and ulcers and cancers of the stomach and bowels. Unfortunately the symptoms and physical signs in digestive disease are not as definite as they are in diseases of the thorax, but like the diseases of the kidneys, require the aid and corroboration of the laboratory and the microscope for satisfactory diagnosis. I assume that no physician would hazard a diagnosis in kidney disease without a careful urinary analysis, and I feel sure that a diagnosis in gastro-enterology without a gastric and fecal analysis would be quite as hazardous with the chances of error largely predominant. Fortunately, it requires neither very costly apparatus nor great technical skill to make such analysis, and all chronic stomach and bowel cases should be accorded its benefits and advantages. It is generally admitted by late and most trustworthy authorities on gastro-enterology that there is an indefinite period in cancers of the pyloris when operation offers excellent chances of permanent recovery, but alas, that favorable opportunity has long passed before the ordinary physical signs and symptoms warrant a cancer diagnosis even in the hands of the most skillful and painstaking examiner, and the negligent and unskillful one will not recognize the true condition until Fate points to an open grave and sternly commands the victim to depart. I am free to confess that in very early cancer of the stomach "all signs may fail," and the diagnosis remain doubtful for a time when all available means have been tried for its detection, but sooner or later, and soon enough for operation to be of great, if not lasting, benefit, gastric analysis will show the failure of free hydrochloric acid, the oncoming tide of lactic acid, occult blood, gastric stasis, and when these are associated with the established and acknowledged symptoms of cancer of the stomach, we need not, indeed, we must not, wait for further physical signs to appear before passing the case to the surgeon. Unless blood has been vomited or passed from the bowels who can say that a given case is ulcer of the stomach or "hyperchlorhydria" until the guaiac or the Benzidine tests have shown whether or not "occult blood" is constantly present, and we appreciate the value of these tests when we consider how widely different are the principles of treatment in those two diseases.

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Outside of the clinical laboratory I cannot imagine any way by which the motility and absorptive power of the stomach can be estimated; per contra: by such aids these functions are calculated with mathematical accuracy not otherwise possible. As an illustration, let us suppose a case of probable cancer of the stomach for analysis, and we proceed as follows: We start on a fasting stomach, *i. e.*, in the morning. At a convenient hour we give a "test breakfast" of a slice of white bread (40 grams) and one and a half glasses of water. In 50 to 60 minutes what remains of it in the stomach is removed with the stomach tube. There should be one to one and a half fluid ounces of the test meal remaining in the stomach, and much above that amount indicates motor insufficiency. Next we place 10cc. of gastric contents in a small glass or porcelain dish, and add 3 gtts. Toppfer's Reagent, which turns it red, the brilliancy of which corresponds to the amount of free hydrochloric acid present. While stirring this mixture briskly, we drop slowly from a burette a deci-normal sodium hydrate sol. into it until the red disappears, leaving the mixture a pale orange color. We then read off the number cc. n-10 Na OH consumed in the reduction and multiply by 10. This gives the amount of free HCl in 100 cc. gastric contents in terms of n-10 Na OH sol., which can be reduced to per cent. of HCl by multiplying this quantity by 0.00365—e. g., if 32 cc. n-10 Na OH has been used—32x0.00365—1.11660 or .11 to .12 of 1 per cent free HCl. To obtain the total acidity, add to the above titration 3 drops of a 1-2 per cent. alcoholic sol. phenolphthalein and stir with a glass rod as before and add the n-10 Na OH a few drops at a time until the gastric contents thus treated become a decided pink color. Now read off the No cc. of n-10 Na OH consumed from the beginning of the first titration, multiply by 10 and the product will represent in terms of n-10 Na OH, the total acidity in 100 cc. gastric contents, and the percentage is obtained by using the fraction 0.00365 as multiplier. An accurate and simple test for lactic acid is the sol. Ferric Chlor. test, as follows: Fill a test tube 2-3 full of water and add just drops enough of Aquous Sol. Ferric Chlor. to color a very faint yellow. Put half this sol. into another test tube, and add a few drops gastric contents. If lactic acid is present it deepens the yellow color, which is shown by comparison with the control tube. An ulcer of the stomach, whether malignant or benign, constantly weeps blood in quantities which may be too small for the microscope to detect, but the Guaiac and the Benzidine tests pick it out as unerringly as the needle points to the pole. Thus it will be seen that from these very simple tests data of considerable practical value are obtained, from which lives might be saved by early operation that otherwise would be lost.

From the stools equally valuable information is obtainable. The appearance of the meat and connective tissue fibres, starch cells and the fats and oils found by analysis and microscope examination, tell true stories about gastric, pancreatic and intestinal digestion and absorption that are of the greatest value in diagnosis and treatment. I saw the above statement proved to my full satisfaction last summer while doing clinical work in an eastern hospital.

I have had under treatment in the past twenty-five years five cases, all as much alike as peas from the same pod, and each and every one went slowly down to the grave. I shall not tire you with a description of these cases, but will say that I spent many fruitless hours searching medical literature for a description of disease that would fit their symptoms, but I failed to find it and a post-mortem examination was refused me in every case. A case precisely like those of mine was shown as a clinic in the hospital while I was there, and I had the immense satisfaction of helping to work out the diagnosis. Modern methods untied this tightly-rolled scroll of mystery and as it slowly unwound I read from its folds the secret of those five cases, which were painful memories scattered along the trail of the last twenty-five years.

The detection of the ova of intestinal parasites will clear up knotty problems in several chronic disease conditions. Especially is this true in *uncinaria* and *bothriocephalus latus* infections, each of which produce anemias so much like pernicious anemia that without a thorough fecal examination they would deceive the very elect in their efforts to differentiate them. The constant presence in the bowel movements of occult blood in patients on meat free diet, and in whom there is no rectal disease, points unerringly to ulceration higher up in the bowels or stomach, and may and often does enable us to make a diagnosis which was impossible without its aid. There are cases occasionally coming up with symptoms of gallstone impaction in which it is difficult or impossible to say whether it is the cystic or the common duct obstructed, but the presence or absence in the stools of hydrobilirubin or of unconverted bile would settle the question with absolute certainty.

FRACTURE OF THE BASE OF THE SKULL, WITH REPORT OF A CASE.*

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This subject has been so frequently and ably discussed in the literature and in surgeon's meetings, that I do not hope to tell you anything new, but I trust to interest you in the case report.

Fracture of the base of the skull is always a serious injury, and is usually a compound, complicated fracture. Any one of the three fossæ may be involved, or all may be involved. But most authors agree that the middle fossa suffers most frequently and is often associated with fracture of the anterior fossa. "While the posterior fossa is not so frequently fractured, a fracture here is more serious than either, or both the other two" (1).

Basal fractures are due to direct and indirect violence, and to extension of fractures of the vault. Cushing estimates that sixty (60) per cent. of all fractures of the skull are results from falls from a height; about one-half of these involve the base, often alone, sometimes with associated fracture of the vault. On the other hand, it is estimated that seventy to seventy-five per cent. of all fractures of the vault are accompanied by basal injuries. A fracture of the base, by direct violence, may occur as the result of any pointed object forcibly entering the eye, nose, mouth or ear, or by gun-shot wounds; also by blows on the nape of the neck.

Fractures by indirect violence may occur from falls from a height, alighting on the feet, knees or buttocks where the spine is held rigid by muscular action, and by falls or blows on the chin; the latter is known as "The prize-fighters' fracture;" also by striking the side of the head a heavy blow with a broad-surfaced object, or against a broad-surfaced object in falls, and here we have what is termed a "bursting fracture of the base" (2). This often occurs without fracture of the vault and is the most common form of basal fracture.

Fracture by extension may occur in any fracture of the vault, but is commonly due to violent or diffused force, and is often simply a fissure fracture, traveling the shortest route from vault to base, without regard to sutures or density of bones. The base is rarely fractured by countre-coup (3).

Diagnosis of fracture at the base of the skull is made from one or more of the following signs. (a) Hemorrhage into, or the presence of air in, the tissues around the base; (b) escape of blood, cerebro-spinal fluid, or even brain substance external from the ear, nose or mouth; (c) evidence of injury to the cranial nerves or the vessels at the base of the skull (4).

Prognosis: These fractures are not so often fatal as in pre-aseptic days, the mortality having been greatly reduced by asepsis and antiseptics. There are several points to be carefully noted in making a prognosis: the behavior of the pupil is important. Lovett & Munroe find that the pupils failed to react in 39 out of 53 fatal cases of basal fractures, in which they were recorded. The pupils failed to react in only 1 out of 12 cases, with recovery after basal fractures. Nicholas finds that in 54 cases of head injury with non-reacting pupils, 47 died; that in the 24 cases diagnosticated as basal fractures, all were fatal" (5). Temperature is higher in severe brain-injuries than in simply fractures.

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